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GB 2121681 A

GB 1180605 A

GB 0385777 A

US 3638867 A

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(54) Adjustable fluid supply nozzle

(57) A fluid supply nozzle e.g. for attachment to the windscreen wiper arm or blade of a vehicle, has a body (70) formed with an axial passageway (74) into which a skirt portion (80) of a closure member (75) extends. The closure member (75) is rotatably mounted in body (70). The skirt (80) includes a flat peripheral portion (81) or a cut-away or slotted part positioned adjacent a fluid outlet aperture (82) communicating with jet ports (83, 84). The fluid flow through the outlet (82) can be adjusted by rotating the closure member (75) relative to the body (70) so that the skirt (80) progressively obstructs or opens the cross section of the outlet aperture (82). The arrangement is particularly useful with a construction wherein an electrical heating wire element (86) extends from a fluid flow container along a supply tube (71) into the nozzle where a terminating connector (87) is provided.

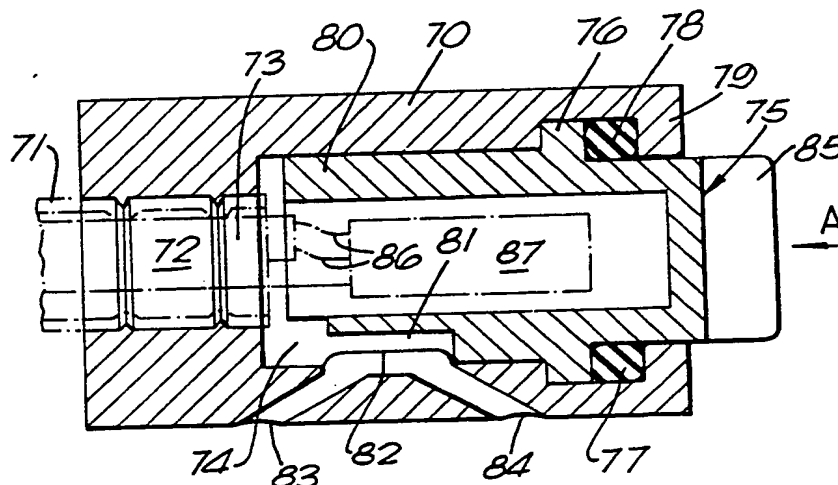
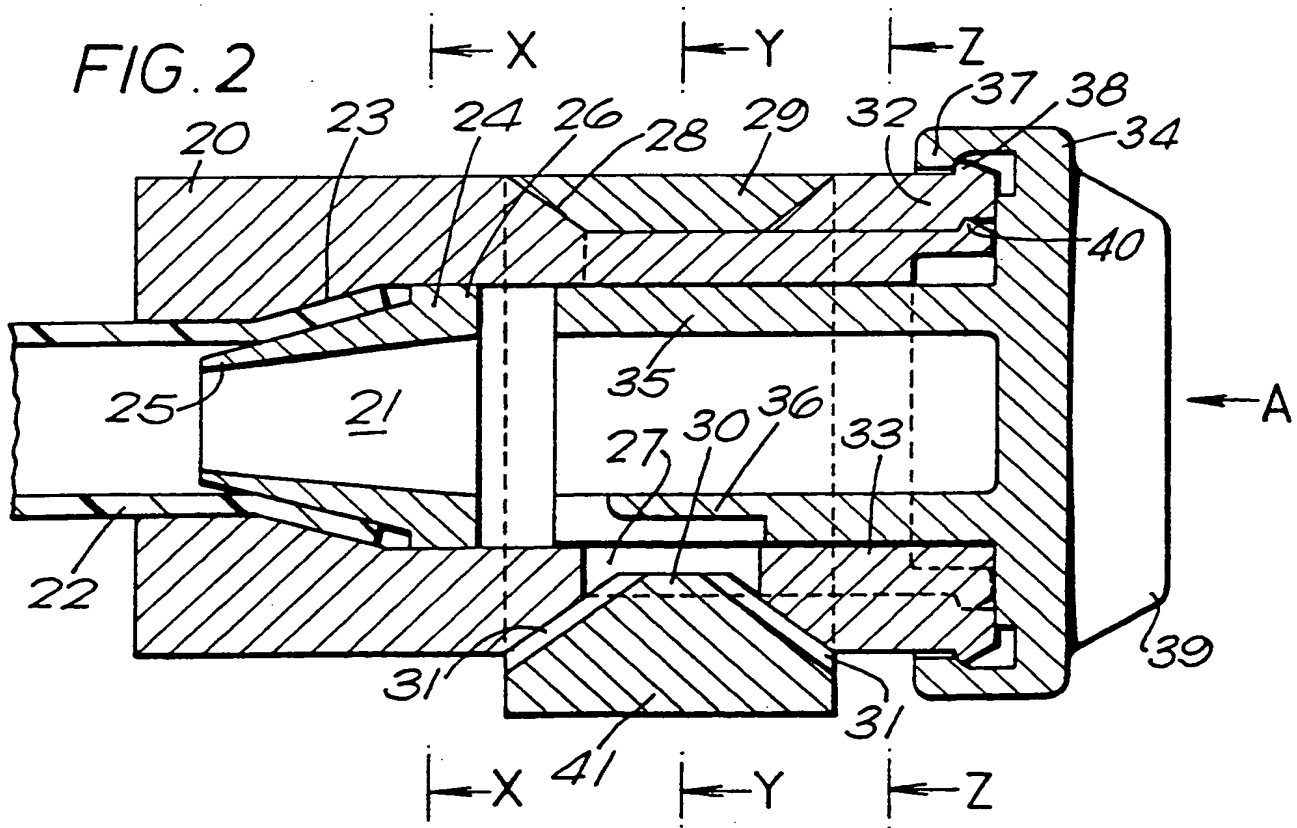
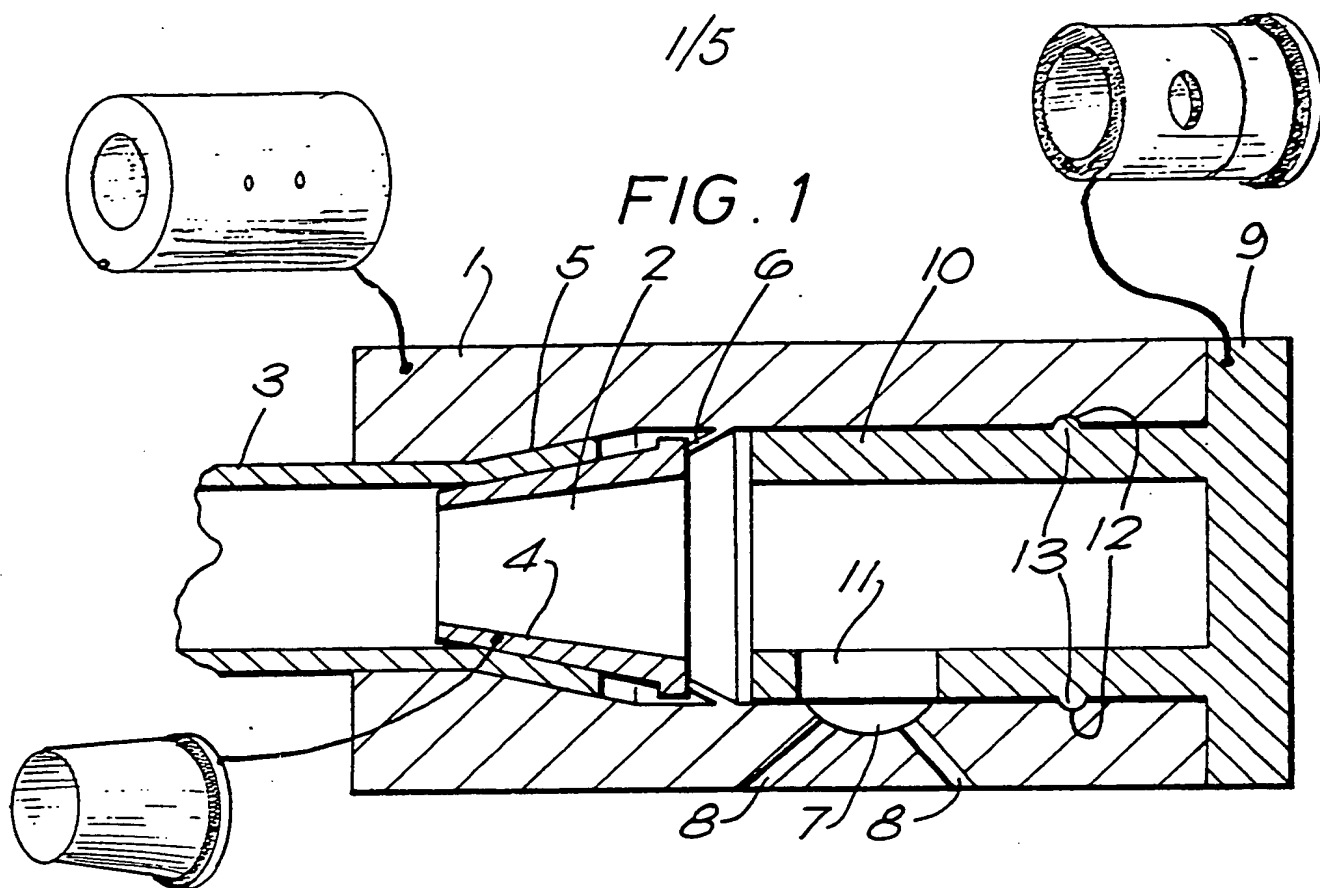


FIG. 7

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FIG. 3

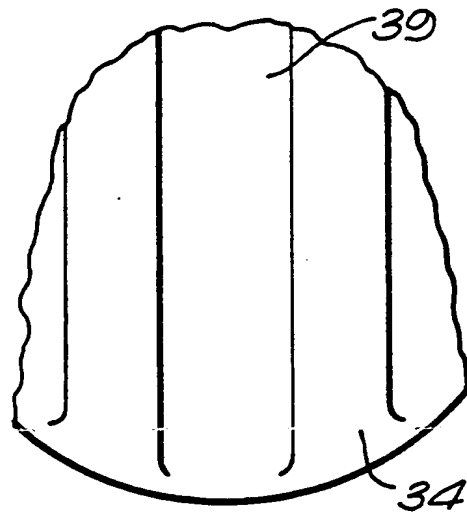


FIG. 10

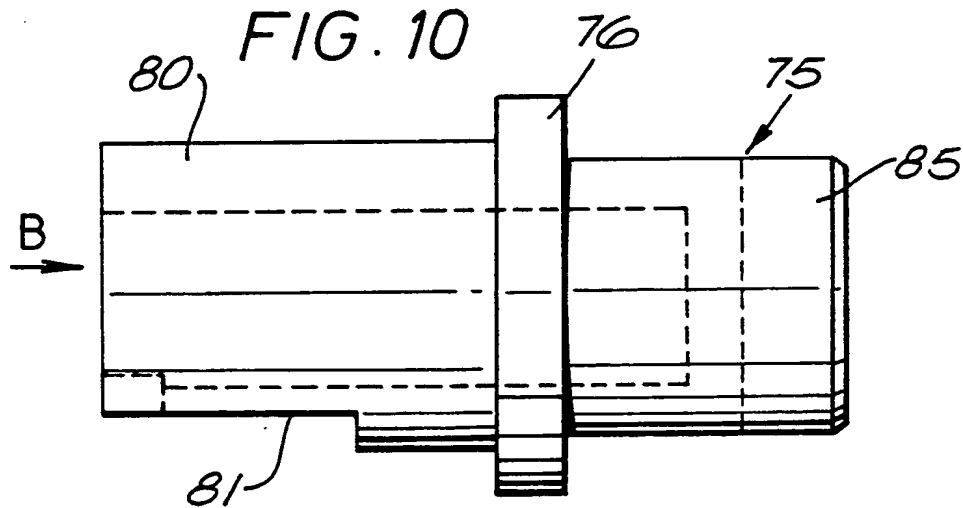
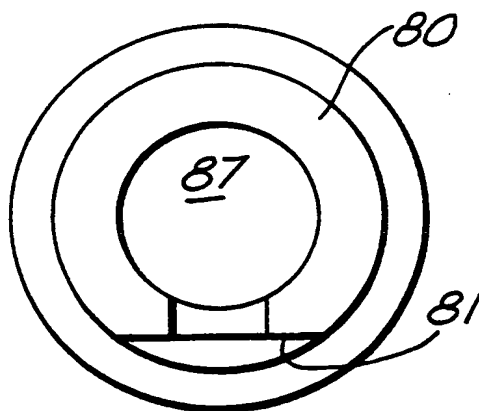
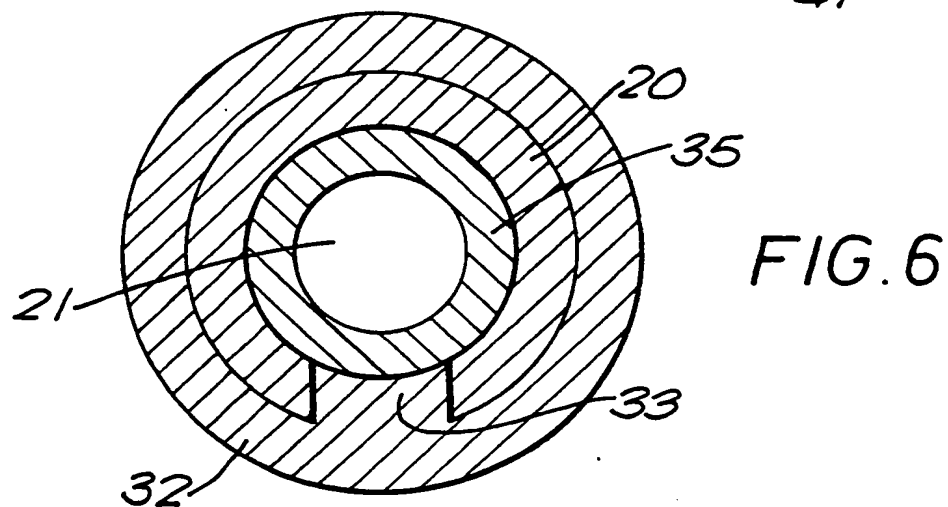
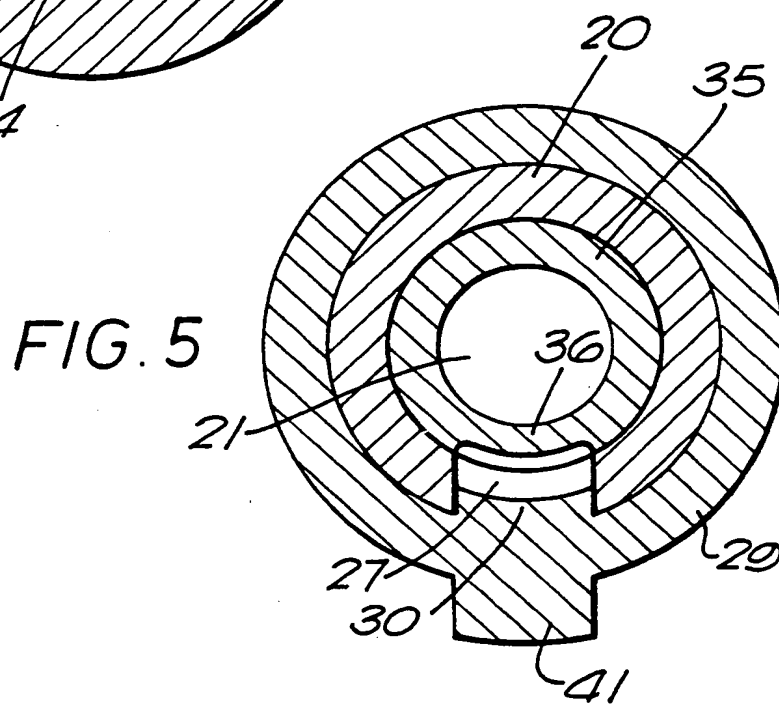
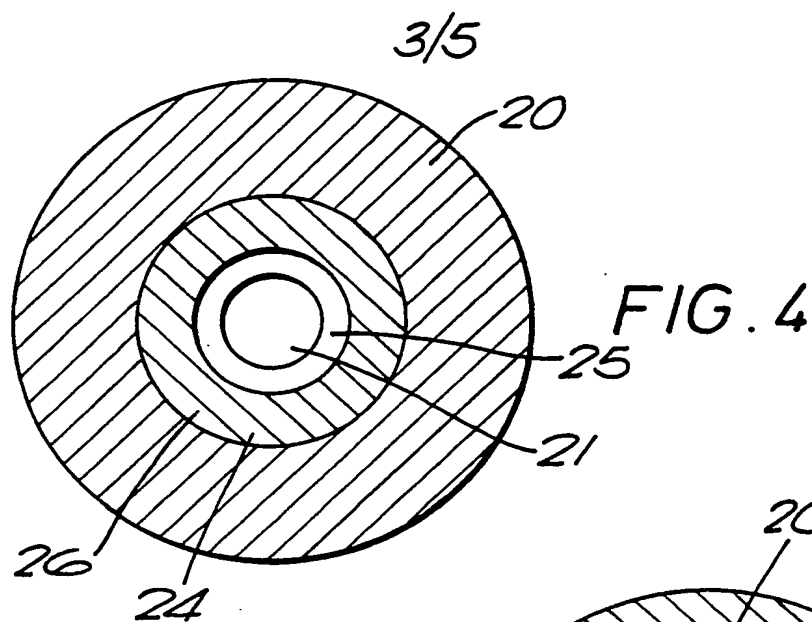
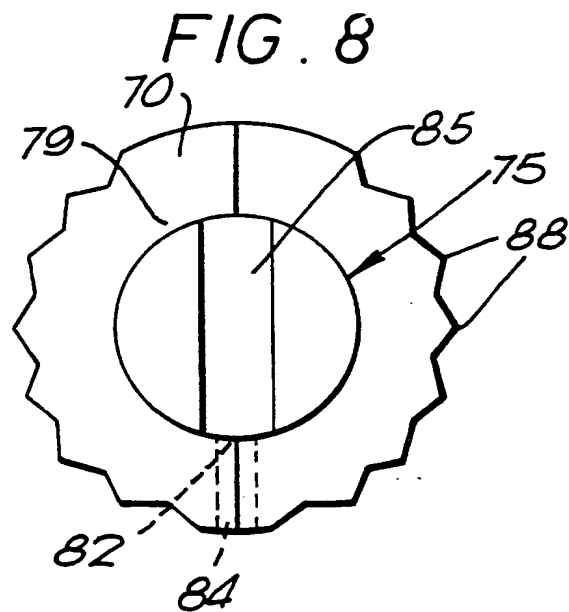
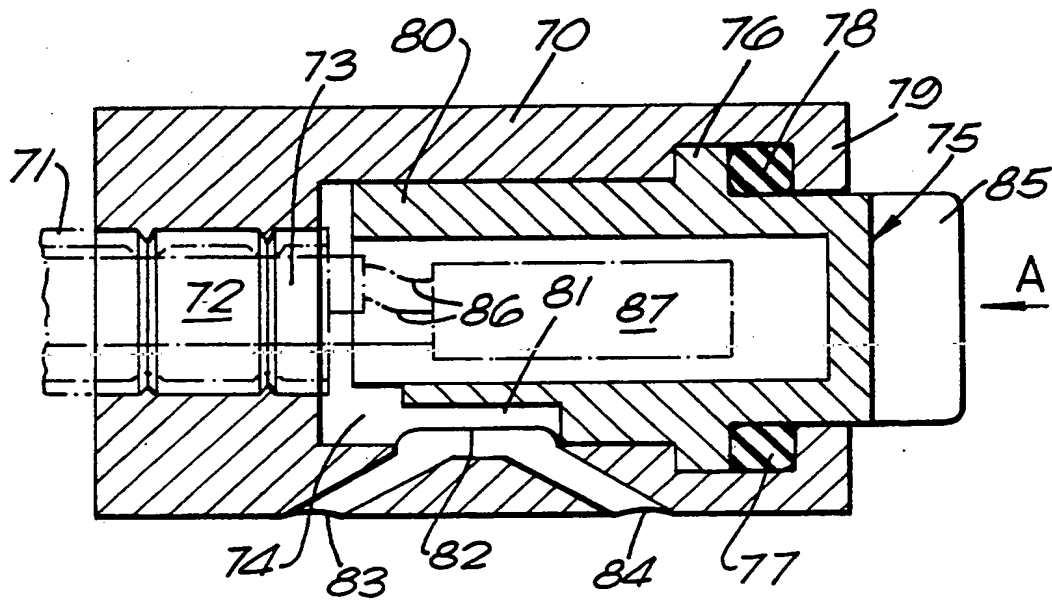


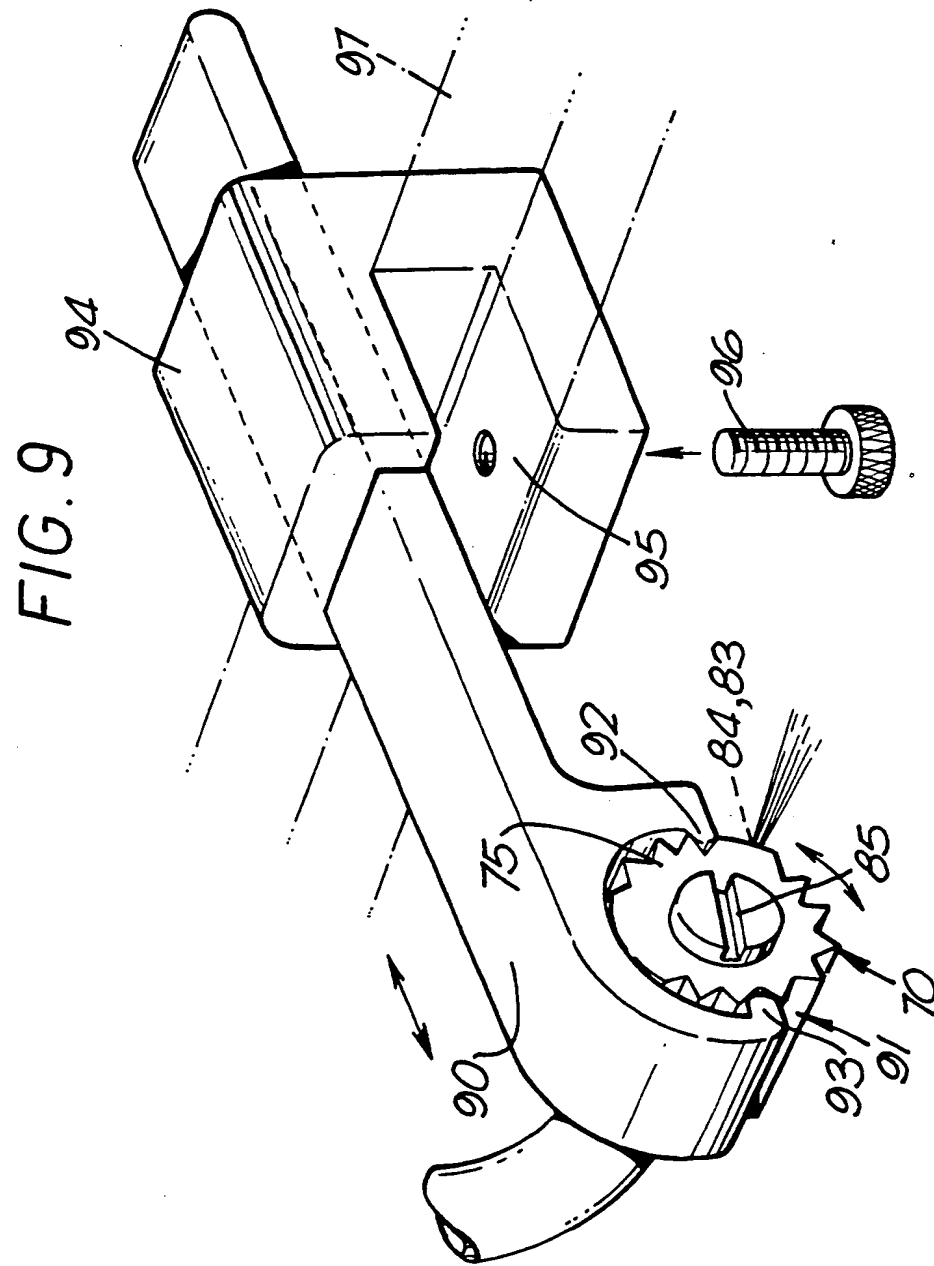
FIG. 11





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TITLE

Fluid Outlet Nozzle

This invention relates to a fluid outlet nozzle primarily but not essentially for use in a vehicle windscreen washing system and wherein the fluid supply duct to the nozzle incorporates an electrical heating element. Such a system is disclosed in GB 2121681 and the present invention provides an improved nozzle construction which may be attached to the windscreen wiper arm.

According to this invention there is provided a fluid supply nozzle comprising a body having an axially extending passageway with one end of said passageway having a coupling means for a fluid supply, an aperture through the side wall of the body forming a fluid outlet and a closure member at the other end of the body, the closure member having a skirt entering the passageway in the body and being rotatable relative thereto, the skirt co-operating with the aperture to provide control of fluid flow therethrough by rotation of the closure member.

The closure member may comprise a cap superimposed on the other end of the body or a plug embraced by the

other end of the body.

The aperture through the side wall of the body may comprise one or more ducts forming jets whereby the outlet fluid flow is directed in the form of a jet or spray in a selected direction. In one embodiment an annular channel is provided around the external periphery of the body with the aperture (or apertures) opening into the base of said channel. Located within the channel is a complementary shaped ring member with the inner facing surface or surfaces having channels through which fluid from the aperture in the body may flow in the form of an external jet.

The cap member may be a snap fit over the other end of the body or the plug may be a snap fit within the other end of the body and the skirt may comprise a cylindrical extension entering the passageway in the body. A portion of the skirt may include a cut away or slotted part which, on rotation of the cap, may progressively obstruct the aperture or apertures thereby to provide a means for controlling the flow of fluid.

According to this invention there is further provided a windscreen cleaning system for vehicles comprising, for attachment to a windscreen wiper blade or arm or in combination therewith, a fluid duct feeding a supply nozzle with orifices positioned in proximity to

the blade and in communication with a tubing portion for connection with a fluid supply and delivery means, the duct and tubing having an electric heating element extending therein and the fluid supply nozzle comprising a body having an axially extending passageway with one end of said passageway having a coupling means for a fluid supply duct, an aperture through the side wall of the body forming a fluid outlet and a closure member at the other end of the body, the closure member having a skirt engaging the passageway in the body and being rotatable relative thereto, the skirt co-operating with the aperture to provide fluid flow control through rotation of the cap. Embodiments according to this invention are shown by way of examples in the accompanying drawings which also illustrate a number of preferred features.

In the drawings:

Figure 1 shows a longitudinal section through one embodiment of fluid supply nozzle according to the invention,

Figure 2 shows a longitudinal section through a second embodiment of fluid supply nozzle,

Figure 3 shows an end view looking in the direction of arrow A of Figure 2,

Figures 4, 5 and 6 show respectively sections on

lines X-X, Y-Y and Z-Z of Figure 2,
Figure 7 shows in section an alternative
construction of nozzle,
Figure 8 shows an end view in the direction A shown
in Figure 7,
Figure 9 shows an arrangement for securing the
nozzle of Figure 7 to a windscreen wiper
arm,
Figure 10 shows a side view of the closure member,
and
Figure 11 shows an end view of the closure member
looking in direction B of Figure 10.

Referring firstly to Figure 1 of the drawings the
fluid supply nozzle comprises a body 1 having an axially
extending passageway 2 with the one end of the passageway
being adapted to receive a fluid supply duct 3 which is
secured by means of a tapered retaining ring 4. The
passageway 2 is formed at this end with a conical taper 5
which co-operates with the ring 4 such that when the ring
4 is forced into the bore of the tube 3 same is flared
outwardly to be firmly forced against the taper surface
5. When the ring is fully home it is retained by a
locking ring 6 forming a detent.

The body 1 has a an aperture 7 through the side wall
with the aperture feeding into jet channels 8 which are

angled to provide the required spray pattern on a vehicle windscreen for example. The other end of the body 1 has a closure member comprising a cap member 9 which has a cylindrical skirt 10 extending into the passageway 2 with the skirt 10 being provided with a part 11 forming a flow control means in conjunction with passageway 7. The arrangement is such that when cap 9 is rotated the portion 11 selectively opens or closes the aperture 7, thus providing fluid flow control. The cap 9 is made to be a snap fit into the body by virtue of co-operating recesses and protuberances 12 and 13.

With this construction the body of the nozzle may be connected up to the supply duct 3 and the retaining ring 4 located in position after which the cap 9 may be snap fitted to complete the assembly. Means are provided by which the complete fluid supply nozzle assembly may be attached to the windscreen wiper arm of a vehicle. This attachment may be by way of a support member having a clamp means at one end to secure same to the windscreen wiper arm and a fitment at the other end to receive the fluid supply nozzle assembly.

Figure 2 shows a further preferred embodiment comprising a body 20 having an axially extending passageway 21 with one end of the passageway being adapted to receive an end of a plastic fluid supply duct

22. Within this end of the body 20 a tapered surface 23 is provided which co-operates with a tapered tube retaining ring 24 having a nose 25 to engage within the tube 22 and to force same outwardly to firmly contact the tapered surface 23 of the body. A shouldered portion 26 of the ring 24 frictionally engages the internal passageway 21 whereby the tube is firmly retained within the body in a fluid tight manner. The body 20 is provided with a fluid outlet aperture 27 in the region of which the outer peripheral portion of the body 20 is of reduced diameter providing an abutment shoulder 28. A nozzle ring member 29 locates over the body and has a complementary end surface which abuts the shoulder 28. The ring 29 incorporates an inwardly projecting portion 30 which engages aperture 27 and is further provided with channels 31 which define fluid outlet ducts forming jets. Ring 29 is retained by a sealing ring member 32 which includes an inwardly projecting part 33 which closes off the end part of the aperture 27 which is formed by a slot through the wall of the body 20. This slot 27 thus forms not only the aperture through the wall of the body 20 for fluid flow but also serves as an abutment to prevent rotation of the ring 29, by virtue of the portion 30 entering the slot, and rotation of the ring 32, by virtue of the portion 33 entering the said slot. The

other end of the body 20 has an external lip 40 over which rings 29 and 32 may be forced to thereafter form a snap-engagement. The other end of the body 20 is closed by means of a cap member 34 which has a cylindrical portion 35 entering the bore 21 and which forms a skirt. A portion of this skirt 36 is adapted so that on rotation of the cap 34 the effective cross sectional area of the fluid flow aperture 31 is made variable, thus providing a means for adjusting the fluid flow from the outlet channels 31. The cap includes portions 37 which snap engage over outer projections 38 on the ring 32.

The ring 29 may include a projecting portion 41 which in use serves to locate the nozzle on a clamp bar assembly in a non-rotatable manner.

With this construction as shown, a feature is that all the components may be made from mouldings of a plastics material and the rings 29 and 32 may be fitted on to the body in a simple manner, to be retained by the end projection 40. Fluid flow tube 22 may be readily connected up on installation whereafter the end cap 34 is snap-fitted to complete the assembly. By making the rings 29 and 32 dismountable, any foreign matter which has entered the system and which may be blocking the outlet channels 31, can be readily removed. The arrangement also provides for an electric heating element

to be received within the fluid flow duct 22 with the end terminal of the element being housed within the end of the passageway 21. The nozzle is particularly useful when used with a windscreen cleaning system wherein the fluid supply tubing incorporates an electric heating element extending therein as described and claimed in GB 2121681.

A further embodiment is illustrated in Figures 7, 8, 10 and 11 of the drawings. Referring to these Figures, the fluid supply nozzle comprises a body member 70 formed from two parts divided laterally along the centre line passing through a fluid inlet tube 71. The fluid inlet tube 71 includes annular projecting portions 72 and 73 which engage complementary parts of the body to form a secure fitting. The parts of the body moulding together with the tube 71 are connected by means of adhesive. The body 70 includes an axially extending passageway 74 with the tube 71 communicating with the one end and the other end receiving a closure member 75 formed by a plug-like element. The plug element 75 includes a peripheral flange 76 which engages an internal peripheral groove 77 in the body 70 with a resilient O-ring 78 forming a fluid-tight seal and positioned within the recess 77 between the flange 76 and end face part 79 of the body 70.

The plug member 75 has a skirt portion 80 which extends longitudinally into the passageway and which includes a cutaway flat portion 81. The side wall of the body 70 has an aperture 82 communicating with fluid outlet jets 83 and 84 directed in appropriate directions. The end of the plug 75 has a cross cut 85 by which rotational motion may be imparted through application of a screwdriver or like instrument.

Thus, through this means and rotation of the plug 75 the flat 81 on the plug skirt 80 may be caused to progressively obstruct or open up the aperture 82 thus providing control of fluid outflow. When the nozzle assembly is used in conjunction with the system disclosed in GB 2121681 the electrical heating element wires 86 may be brought into a passageway in the body 70 with a suitable connector means 87 positioned within the skirt 80. The arrangement will therefore provide adequate heating of the fluid supply from the fluid container, along the duct to the tube 71 and into the nozzle assembly itself.

As shown in Figure 8, the external periphery of the body 70 is provided with longitudinally extending angularities in the nature of spines 88 by which the nozzle may be located in a suitable arm to be attached to a windscreen wiper.

Referring to Figure 9, an arrangement is shown for securing the nozzle assembly 70 to a windscreen wiper arm with the construction including a support member 90 with an integrally formed jaw 91 incorporating two opposed inwardly projecting finger members 92 and 93. Said finger members are adapted to engage the longitudinal channels formed by the angulations 88 and with this arrangement the relative rotational position of the member 70 within the jaws 91 can be adjusted so as to provide the appropriate direction of fluid outlet from the nozzles 83 and 84. A clip member 94 slidably receives the other end of the support 90 and the clip member incorporates a channel 95 with an associated locking screw 96 whereby same may be secured to a windscreen wiper arm indicated generally as 97.

CLAIMS

1. A fluid supply nozzle comprising a body having an axially extending passageway with one end of said passageway having a coupling means for a fluid supply, an aperture through the side wall of the body forming a fluid outlet and a closure member at the other end of the body, the closure member having a skirt entering the passageway in the body and being rotatable relative thereto, the skirt co-operating with the aperture to provide control of fluid flow therethrough by rotation of the closure member.
2. A nozzle according to Claim 1, wherein the closure member comprises a cap located over the other end of the body.
3. A nozzle according to Claim 1, wherein the closure member comprises a plug located within the other end of the body.
4. A nozzle according to Claim 2 or 3, wherein the closure member has a snap-fit engagement with the body.
5. A nozzle according to any preceding claim, wherein

the skirt comprises a cylindrical extension of the closure member with a cut away or slotted part which, on rotation of the cap, may progressively obstruct the aperture or apertures thereby to provide a means for controlling the flow of fluid.

6. A nozzle according to any preceding claim, wherein an annular channel is provided around the external periphery of the body with the aperture (or apertures) opening into the base of said channel.

7. A nozzle according to Claim 6, wherein located within the channel is a complementary shaped ring member with the inner facing surface or surfaces having channels through which fluid from the aperture in the body may flow in the form of an external jet.

8. A nozzle according to any preceding claim, wherein the external surface of the body has a plurality of longitudinal channels, a support member having a cradle with projections forming opposed jaws to engage a respective diametrically opposed channel, and a clip member to secure the support member to a windscreen wiper arm.

9. A windscreen cleaning system for vehicles comprising, for attachment to a windscreen wiper blade or arm or in combination therewith, a fluid duct feeding a supply nozzle with orifices positioned in proximity to the blade and in communication with a tubing portion for connection with a fluid supply and delivery means, the duct and tubing having an electric heating element extending therein and the fluid supply nozzle comprising a body having an axially extending passageway with one end of said passageway having a coupling means for a fluid supply duct, an aperture through the side wall of the body forming a fluid outlet and a closure member at the other end of the body, the closure member having a skirt engaging the passageway in the body and being rotatable relative thereto, the skirt co-operating with the aperture to provide fluid flow control through rotation of the cap.

10. A nozzle constructed and arranged to function as described herein and exemplified with reference to Figures 1 to 6 of the drawings.

11. A nozzle constructed and arranged to function as described herein and exemplified with reference to Figures 7 to 11 of the drawings.

12. A windscreen cleaning system for a vehicle incorporating a fluid supply as hereinbefore claimed or described with reference to Figures 1 to 6 of the drawings.

13. A windscreen cleaning system for a vehicle incorporating a fluid supply as hereinbefore claimed or described with reference to Figures 7 to 11 of the drawings.